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A New Method of Reflex Elicitation

PRELIMINARY REPORT

WALTER B. SWIFT, M.D.

Formerly Assistant to Physicians for Nervous Diseases, Boston City
Hospital. Instructor in Neuropathology, Tufts College Medical
School, Boston. In charge, Voice Clinic, Boston
State Hospital, Psychopathic Department

BOSTON

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After completing four or five researches on different phases of reflex action during which some two thousand observations were made, and after seeing several diagnoses made wrongly on what seemed to be misinterpreted or insufficient reflex data, I came to the conclusion that there was a crying need of a more efficient mode of reflex elicitation available for application in exceptional cases.

I tried first to improve present methods of elicitation. To that end I visited Jendrassik in Budapest and obtained personal instruction as to his method of applying the hand-grasp. I put this into practice in many cases at the Boston City Hospital and when I found his technic an improvement over our own I published the results.¹ Innumerable attempts to improve old methods met with failure. Then I began to search for some entirely new avenue of approach. I felt the need of another method not only for its worth in clinical routine examination, but also to enhance the value of my researches in reference to reflex frequency,² and other reflex propositions not as yet published.

Therefore a series of reflexes were tried during and after the passage of the electric currents—galvanic and faradic. My sincere appreciation is due to Dr.

* From the Neurological Department of Boston City Hospital, Service of Prof. John Jenks Thomas.

* Read before the Section on Nervous and Mental Diseases at the Sixty-Fifth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1914.

1. Swift, Walter B.: Studies in Neurological Technique No. 1: The Points in Jendrassik's Method of Eliciting the Patella Reflex, *Alienist and Neurologist*, 1913, xxxiv, No. 3.

2. Swift, Walter B.: Reflex Frequency and Its Clinical Value, *Jour. Nerv. and Ment. Dis.*, 1913, xl, No. 9.

John J. Thomas for opportunity to carry on this research at the Boston City Hospital. Minutely the problem was as follows:

THE PROBLEM

Galvanism and faradism, strong and weak currents, were passed in cases of normal, exaggerated, pathologic and absent reflexes. Although this research is still in process, sufficient positive data of value have been obtained to warrant the presentation at this time of several new facts in the form of a preliminary report.

A. I find that with weak faradic current, *normal reflexes* change as follows:

The Triceps: Unchanged in 3 cases. More pronounced in 3 cases.

Wrist: Unchanged in 2 cases. More pronounced 2 cases.

Radial: Unchanged 3 cases.

Biceps: Unchanged 1 case. More pronounced 2 cases.

Knee-Jerk: Unchanged in 4 cases. More pronounced in 2 cases.

Achilles: Unchanged 2 cases. More pronounced 2 cases.

Plantar: Unchanged 2 cases.

B. I find that with weak faradic current, *exaggerated reflexes* change as follows:

Triceps, Wrist, Radial, Biceps: Unchanged 1 case each.

Knee-Jerk: More pronounced exaggeration in 3 cases.

Achilles: Unchanged 1 case.

One case showed leg clonus on patella tap, when without electricity both knee-jerks were merely exaggerated.

C. With weak faradic current, not enough cases were tried to tabulate any pathologic reflexes.

D. I find that with mild faradic current, *absent reflexes* changed as follows:

In one case of multiple neuritis, knee-jerk pronounced absent by every other method of reenforcement clearly elicited with weak faradic current and just after the current had passed.

In one case of anterior poliomyelitis (?) right Achilles pronounced absent by Dr. Thomas with usual methods of reenforcement. Found later to be absent because tired out. Obtained, however, after being tired out during the passage of a mild faradic current. Came about every other trial. Also found occasionally present after the current had passed and was again cut off. (Dr. Daly's observation.)

In one case of paresthesia of hand, knee-jerk reported absent on both sides with all other methods of reenforcement but obtained in mild faradic current on both sides. In the same case the right Achilles pronounced absent but elicited with a mild faradic current, a mild galvanic current, and a strong galvanic current.

Had there been *but one positive case*, had electricity only once elicited a reflex not obtainable by any other method of elicitation, it would have been worth reporting. But here are several.

CONCLUSIONS FROM THESE FINDINGS

From some 46 tests of the reflexes during the passage of the electric current, including normal, exaggerated, pathologic and absent reflexes, the phenomena show the following data:

1. Normal reflexes are made more active in about half the cases examined.
2. Exaggerated reflexes are unchanged in the arm, made more pronounced in the leg with exception of the Achilles.
3. Not enough pathologic reflexes were tried to warrant any conclusion.
4. Absent reflexes are generally unaffected but are sometimes elicited with this method when all other methods have failed. Applicable to the knee-jerk and Achilles.

COMMENT

That the electric current enhances the normal knee-jerk has no clinical value; also that during the current exaggerated reflexes become more exaggerated is of no great value. Whatever changes may be found in pathologic reflexes, and I predict here an increase, may contribute little. The fact of indirect value that they contribute to the situation is the general effect of electricity on general reflex action—the action of enhancing them—a fact that makes the findings under absent reflexes of more weight than if the opposite had been true. For if no increase of reflex action had been found in normal and exaggerated reflexes, we would be inclined to doubt such findings under absent reflexes, but finding they are increased in action when normal, and when exaggerated, we are still more inclined to expect that same action when the reflexes are absent by usual methods.

This finding of enhancement of them among normal and exaggerated reflexes lends momentum to the findings while the current is passing through otherwise absent reflexes.

Among absent reflexes the current occasionally elicits a reflex otherwise unobtainable. This is surely of some clinical value as a new and improved method of reflex elicitation.

Granted, many absent reflexes are pathologically absent and then no current can elicit them—as for example I have found in tabes—but there exist *border-line cases*—even cases in which absent or present may turn a diagnosis or markedly change a prognosis—and it is in these latent reflexes (that occasionally are so important to find), that this new method plays a service to neurologic routine examination in succeeding in demonstrating their elicitation.

SUMMARY AND CLINICAL VALUE

Examination of over forty cases of reflexes during and some after (Daly) the passage of the electric current demonstrates that the general effect of electricity on the reflexes is that of a reenforcement—which finds its special clinical value by elicitation of some of the absent reflexes unobtainable by any other method. I therefore claim a new method of reflex reenforcement of sufficient value to be included among other routine and neurologic examination methods in the following order: pendulum leg, diversion of mental attention, constant movement during stimulus, the Jendrassik hand-grasp, and finally, when all others fail, the electrical reenforcement.

ABSTRACT OF DISCUSSION

DR. J. T. FISHER, Los Angeles: Dr. Swift is to be congratulated on discovering a method of eliciting a lost reflex. I would like to have him explain a little more in detail the technic of the procedure, and would ask, in addition, if we are to understand that when the knee-jerk is gone, lost forever, as we see in cases of well-advanced tabes, he can reproduce that reflex by the method which he uses, or whether he has reference merely to the lost reflex which sometimes does occur in functional cases due to overfatigue of the reflex arc by the ordinary method of taking a reflex.

DR. WILLIAM W. GRAVES, St. Louis: We need, of course, anything in clinical work which will aid in determining the functional activity of the nervous system, and among its

activities, those pertaining to reflexes are of the first order. Until it is a uniform practice to guard against the pitfalls in the use of reflexes, we shall not be able to use all of the refinements in examinations. I did not understand whether it was during the attempt to elicit a given reflex—the knee-jerk, for instance—that the electric current was passed, and whether it was assumed that the stimulation served as a means of increasing the excitability of the reflex arcs, or whether the use of the current was merely a means of suddenly diverting the patient's attention. I would ask Dr. Swift to explain these points in closing.

DR. WALTER B. SWIFT, Boston: Dr. Fisher asked about the technic in eliciting the knee-jerk. I put one electrode under the leg of a sitting patient and the other one on the calf. In eliciting the Achilles tendon reflex I put one electrode on the calf and one on the sole of the foot. I find it does not make any difference which electrode is put above and which one below. Dr. Fisher also asked about the type of the reflex that I attempted to bring out. I agree with the suggestion made by Dr. Fisher that the absolute pathologically broken arc can not be revived in its function, and that the lost reflexes of tabes and other pathologic lesions when the arc, either of the motor side or of the sensory side, is entirely gone, cannot be brought out by this method. This will perhaps also answer Dr. Graves' question: It is applicable in border-line cases; that is, those in which other methods have failed to elicit a reflex, and in an arc that is intact. In cases in which our diagnosis turns more or less on the absence or presence of a reflex, and in which it is found impossible to elicit those reflexes by our usual methods of reinforcement, this is a final resort. I would not by any means propose that this should be a matter of "usual routine in neurologic examinations. I think that is entirely out of the question; but I do think that it is of value in rare cases and in border-line cases when other methods of elicitation have failed, and that I have found in the clinic of the Boston City Hospital in these cases that I have reported. Dr. Graves asked about the effect of the electricity. The reflex is taken with the current on; that is, the current is started and the reflex is taken during the passage of the current. He also asked whether it was the effect of the current that elicited the reflex, or the diversion of the attention. From the fact that the reflex has also been obtained after the current has passed and after the electrodes have been removed I would be inclined to give the credit to the passage of the electricity, especially as these cases have failed to show reflexes when other methods of diversion of the attention have been employed.

